



CHEMICAL SCIENCES LABORATORY

CSL STRATEGY
2021 - 2026

DRAFT

FROM THE DIRECTOR



Dr. David W. Fahey

At the heart of the NOAA missions is stewardship of the oceans and atmosphere. The NOAA Chemical Sciences Laboratory (CSL) plays a key role in this mission by advancing our knowledge of the chemical and physical processes that affect atmospheric composition and impact the Nation. It is our hope that through the advancement of scientific knowledge at CSL, the Nation will have the needed information about atmospheric chemistry and composition to make optimal decisions for the well-being of current and future generations.

The only constant is change. Therefore, CSL set out to develop a strategy that is adaptive and responsive in order to address evolving and emerging societal issues related to air quality, climate, and the stratosphere. For over five decades, CSL and its predecessor the Aeronomy Laboratory have been leaders in advancing scientific understanding of pressing societal issues such as Los Angeles air quality, the ozone hole, and climate change. As we rose to the challenges of the past, we will rise to the challenges of the future. For example, CSL in collaboration with other NOAA Laboratories is advancing scientific understanding of how natural and human activities might alter the reflectivity of the stratosphere and marine boundary layer, and the potential impacts of those activities on the Earth system. Our strategy also allows for curiosity driven research, knowing that some of the greatest discoveries were not expected, but occurred simply when great minds were given the freedom to explore the world through science.

This document presents the CSL Strategy, four strategic goals the strategy seeks to achieve, and four organizational priorities through which the strategy is implemented. The CSL Strategy is a framework that allows the laboratory to address today's knowns and tomorrow's unknowns in regards to air quality, climate, and the stratosphere. The framework is an iterative process of generating scientific questions to be investigated, developing a state-of-the-art toolbox of instrumentation, laboratory studies, field campaigns, and models to research the questions, analyzing data, and communicating results to scientific, policy, and stakeholder communities. The core of the CSL Strategy is the people who make it happen, namely, our world-class scientists and dedicated technical and administrative staff.

The CSL Strategy is an agile and innovative approach to advancing scientific understanding of atmospheric chemistry and composition, delivering a framework that allows the laboratory to address the unknown topics of tomorrow building on the foundation of the past.

A handwritten signature in black ink, reading "D. W. Fahey". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Dr. David W. Fahey
Director, NOAA Chemical Sciences Laboratory

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CHEMICAL SCIENCES LABORATORY

OUR MISSION

To advance scientific understanding of the chemical and physical processes that affect Earth's atmospheric composition.

OUR VISION

A nation that has the needed scientific understanding and information about atmospheric composition to make optimal decisions for the well-being of current and future generations.

INTRODUCTION

The National Oceanic and Atmospheric Administration's (NOAA) mission is Science, Service, and Stewardship, which is achieved by understanding and predicting changes in climate, weather, oceans, and coasts, sharing that knowledge and information with others, and conserving and managing coastal and marine ecosystems and resources.

The NOAA Office of Oceanic and Atmospheric Research (OAR) is the science and research support for the Agency. OAR delivers NOAA's future by focusing on four strategic goals: explore the marine environment; detect changes in the ocean and atmosphere; make forecasts better; and drive innovative science. The OAR laboratories provide the scientific capacity and capabilities to deliver NOAA's mission and contribute to OAR's strategic goals. Within OAR, the Chemical Sciences Laboratory (CSL) fulfills key areas of research on air quality, climate, and the stratosphere that distinguishes it from other federal laboratories and academic or private institutions.

The CSL staff is composed of world-renowned scientists, experienced technical staff, and committed support staff. CSL has world-class laboratory facilities, state-of-the-art instrumentation and models, access to numerous research platforms, and dedicated resources to advance scientific understanding of atmospheric chemistry and composition. These resources equip CSL to respond to emerging and evolving societal issues related to air quality, climate, and the stratosphere. An important measure of success for CSL is the ability to communicate our scientific results to stakeholders and policymakers who will use the information to underpin decisions and solutions for the challenges posed by present and projected changes that impact atmospheric composition.

The objective of the CSL Strategic Plan is to provide the direction, approach, and rationale for activities to be performed in the coming years. This strategy does not start today, rather, it builds on the tremendous accomplishments of the past, and institutes the framework to continue evolving and building on that legacy.

The CSL Strategy

CSL's Strategy (Figure 1) uses a holistic approach to understand the role of atmospheric chemistry and composition in the Earth system and is designed to address core scientific goals, capitalize on unanticipated discoveries, and deliver results.

CSL's core scientific goals are to improve understanding of:

- » the processes that influence air quality on local, regional, and global scales to support informed **air quality** decision-making at the national, state, and local levels;
- » the anthropogenic and natural processes that affect atmospheric composition and the impacts of those changes on **climate**; and
- » the processes that control the composition of the **stratosphere**, as well as the impacts of stratospheric variability and trends on weather and climate.

The scientific goals feed the CSL Strategy, allowing for discovery, new questions, and stakeholder needs to be addressed using state-of-the-art **instruments** and **models**, world-class **laboratory studies**, and unparalleled **field campaigns**. The outcomes of CSL research inform decision makers, result in transfer technology, contribute to assessments and reports, and deliver an extensive collection of peer-reviewed publications.

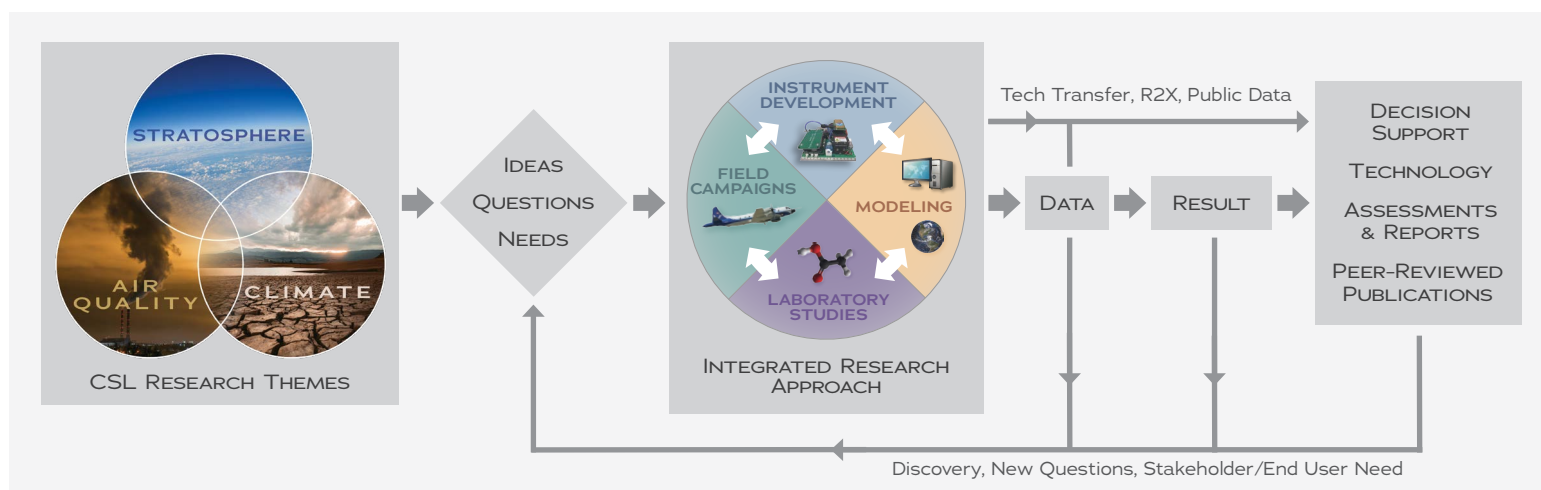


Figure 1. The CSL Strategy

At the core of the CSL Strategy is the people that execute it. Therefore, CSL has a strong commitment to its staff and seeing them excel in their professional and personal lives. CSL is dedicated to cultivating a healthy, supportive, diverse, and inclusive work environment which promotes a collaborative and team-oriented culture.

Ultimately, the CSL Strategy advances scientific understanding of the chemical and physical processes that affect Earth's atmospheric composition and delivers the information to the Nation so that optimal decisions for the well-being of current and future generations can be made.

CSL Strategic Goals

In order to execute its strategy, CSL focuses on four strategic goals:

1. Position CSL as a leader in advancing scientific understanding of the chemical and physical processes that affect atmospheric composition.
2. Shape and drive how the atmosphere is studied through innovation in instrumentation, models, and thought.
3. Be trusted and respected experts (agents) in atmospheric chemistry and composition.
4. Foster the next generation of scientific leadership that is diverse and inclusive.

CSL Organizational Priorities

CSL focuses on four key organizational priorities to implement its strategy and achieve its strategic goals:

- » Research
- » Innovation
- » Partnerships & Leadership
- » People

STRATEGIC GOALS

1

Position CSL as a leader in advancing scientific understanding of the chemical and physical processes that affect atmospheric composition.

2

Shape and drive how the atmosphere is studied through innovation in instrumentation, models, and thought.

3

Be trusted and respected experts (agents) in atmospheric chemistry and composition.

4

Foster the next generation of scientific leadership that is diverse and inclusive.



PRIORITY 1

RESEARCH

CSL focuses on four key areas to implement the Research organizational priority:



Long-Term Research

CSL, and its predecessor the Aeronomy Laboratory, have been researching atmospheric chemistry and composition for over a half a century. This long-term commitment to studying atmospheric chemistry and composition is required in order to advance our understanding of the distribution, trends, perturbations, and processes that affect the Earth system and impact society.



Societal and Stakeholder Needs Research

CSL responds to societal and stakeholder needs by conducting research to inform decision making. In order to address these shorter-term research efforts, CSL has become a leader in organizing and initiating successful field campaigns. The size, scope, and complexity of the field campaigns set CSL apart from other research institutions.



Adaptive and Responsive Research

CSL has an exceptional ability to quickly deploy a critical collection of state-of-the-art instrumentation and modeling capabilities required to address fast-emerging scientific issues and opportunities.



Curiosity Driven Research

CSL encourages curiosity driven research when addressing long-term, societal and stakeholder needs, and adaptive and responsive research. Curiosity driven research often leads to a shift in the research paradigm, impacting the scientific questions that need to be answered to advance our understanding of atmospheric chemistry and composition.



PRIORITY 2

INNOVATION

CSL focuses on three key areas to implement the Innovation organizational priority:



Instrumentation

CSL develops new instruments to meet our changing needs in addressing important scientific questions. The CSL nature of collaboration allows for worldwide expertise in pursuing the most intuitive instrument designs that fall into the categories of innovation (new instrument concepts developed at CSL), evolution (continually improving existing instruments), and adaptation (enhancing the capability of commercially available instruments).



Models

CSL operates, develops, and evaluates models with varying physical and chemical process complexity across wide spatial and temporal scales to generate process- and system-level understanding of Earth's atmosphere. These model developments improve weather, air quality, and climate projections and forecasts.



Thought

CSL fosters an environment that promotes innovative thinking to further understand atmospheric chemistry and composition. CSL scientists are given the freedom to think outside the box and look through a different lens to understand the chemical and physical processes that impact atmospheric composition. The outcome is often disruptive science that changes what we thought we knew about the atmosphere.



PRIORITY 3

PARTNERSHIPS & LEADERSHIP

CSL focuses on four key areas to implement the Partnerships & Leadership organizational priority:



Research Collaborations

CSL actively seeks and engages in research collaborations with other NOAA OAR Laboratories and Programs, NOAA Line Offices, and national and international research organizations, including other Federal agencies, universities, and the private sector.



National and International Contributions

CSL serves in leadership roles on scientific assessment panels, national and international working groups, and scientific advisory committees and plays extensive roles in leading, authoring, and reviewing international and national state-of-understanding reviews and assessments on air quality, climate, and the stratosphere.



Stakeholder Engagement

CSL engages with stakeholders throughout its research activities, fostering relationships and building trust. From this foundation, CSL establishes productive and mutually beneficial partnerships to meet stakeholder needs, contribute to our mission, and assess and translate scientific understanding.



Education and Outreach

CSL fosters the next generation of scientists and increases scientific literacy through its education and outreach efforts. CSL scientists are encouraged to serve as mentors for students of all levels and backgrounds allowing students to discover life as an atmospheric scientist. CSL also increases scientific literacy of atmospheric chemistry and composition issues by engaging with the media, giving public talks, and making its science more accessible to the public.

PRIORITY 4

PEOPLE

CSL focuses on four key areas to implement the People organizational priority:



Collaborative Culture

CSL fosters a collaborative, team-oriented culture to advance scientific understanding of atmospheric chemistry and composition, recognizing that when it comes to scientific thought and execution, the whole is greater than the sum of its parts.



Next-Generation Workforce

CSL aims to foster the leaders of tomorrow within its workforce by promoting and providing training and development opportunities in scientific, leadership, and management skill sets to prepare for the demands of the future.



Diversity and Inclusion

CSL is committed to increasing the diversity within its workforce and creating an inclusive work environment where everyone feels valued and experiences a true sense of belonging. CSL encourages a work environment that includes diversity of thought and diversity of its people to allow the best ideas to flourish.



Well-being

CSL's greatest asset is its people with the well-being of its staff being of utmost importance. CSL recognizes the physical and mental health of its people creates an engaging and productive workplace, which allows people to excel in both their professional and personal lives.



Acknowledgements

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